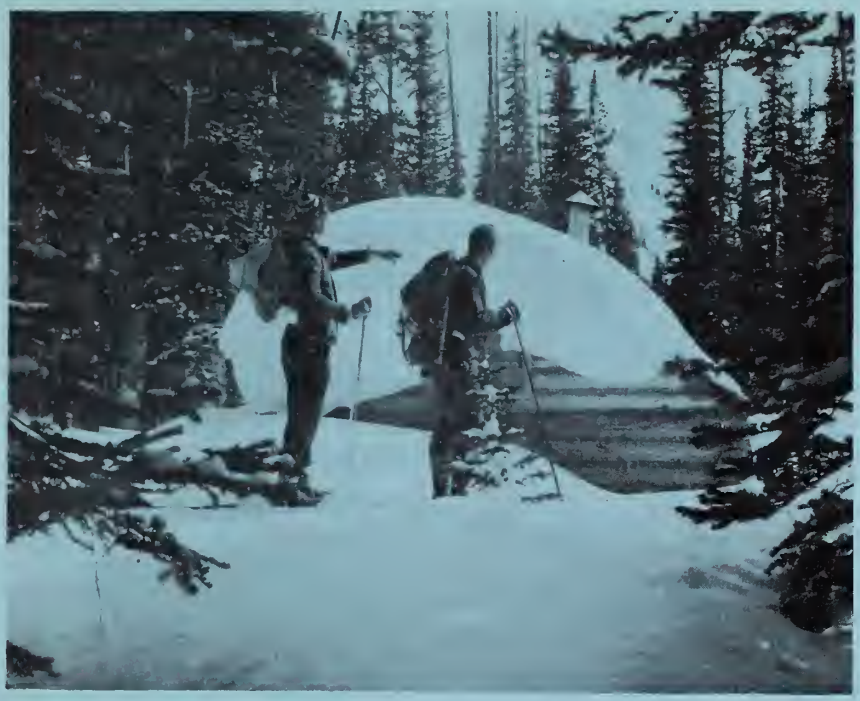

" Welcome Shelter Near Trail's End "

FEDERAL-STATE COOPERATIVE SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

RIO GRANDE DRAINAGE BASIN

MARCH 1, 1947

By

Division of Irrigation, Soil Conservation Service
United States Department of Agriculture
and
Colorado Agricultural Experiment Station

Data included in this report were obtained by the agencies named above in cooperation with the U. S. Forest Service, National Park Service, State Engineers of Colorado and New Mexico and other Federal, State and local organizations.

FEDERAL-STATE COOPERATIVE

SNOW SURVEYS AND IRRIGATION WATER FORECASTS

FOR

RIO GRANDE AND CANADIAN RIVER DRAINAGE BASINS

Report Prepared by

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Soil Conservation Service

and

Colorado Agricultural Experiment Station

Fort Collins, Colorado

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March 1, 1947

WATER SUPPLY OUTLOOK

RIO GRANDE AND CANADIAN DRAINAGE BASINS

The outlook for water supply in irrigated areas served by the Rio Grande and its tributaries is about normal. The water content of the snow in the mountain areas is nearly twice as much as last year, but there is no snow on the valley floor or elsewhere at lower elevations. Soil moisture is generally poor. Reservoir storage is low.

On the mountain areas, north of Santa Fe, and on the headwaters of the Pecos River, the snow cover is very light. On the tributaries to the Canadian the water stored in snow is considerably better than last year and a little below average.

RIO GRANDE

The increase in snow cover during the month of February on the mountains surrounding the San Luis Valley has been less than average, but the water stored in snow is now 100 percent greater than last March 1 and a little less than the average for the period of record. On Wolf Creek Pass the water content of the snow is 20 inches, which is the maximum amount recorded for any station in the valley. Recent snow at lower elevations has been light and there is no snow on the valley floor. Precipitation has been deficient. Soil moisture is reported as poor. Stream flow is normal. Reservoir storage is very low and represents about 35 percent of the past 10-year average on March 1.

Similar snow conditions exist over the headwaters of the Rio Chama and other Rio Grande tributaries near the Colorado-New Mexico border. At higher elevations the snow cover is about normal. However precipitation has been extremely deficient in the middle Rio Grande area. Soil moisture and crop conditions are reported as very poor. Storage in El Vado Reservoir is 30,600 acre-feet, which is only one-third of that stored on March 1 1946.

The combined storage in Elephant Butte and Caballo reservoirs is down to 833,000 acre-feet, as compared with 1,337,000 last year at this time. During the past month the precipitation in the lower Rio Grande valley has been subnormal. Range areas are dry but valley conditions are reported from fair to good.

The snow cover on the headwaters of the Pecos and in the vicinity of Santa Fe continues to be very light. Precipitation in this area is also below normal. However, storage in the Alamogordo, McMillan and Avalon reservoirs is about 70 percent above last year on March 1. Recent precipitation in the Carlsbad area has been subnormal but crop and soil conditions are reported as good.

CANADIAN RIVER

On the tributaries to the Canadian River the water stored in snow is now twice what it was a year ago and slightly below normal. Conchas reservoir has in storage 336,800 acre-feet, as compared to 341,500 March 1, 1946. Precipitation has been sub-normal. Soil moisture and crop conditions are fair to good. Winds have caused loss of surface moisture and damaged wheat.

SNOW SURVEYS AND IRRIGATION WATER FORECASTS
RIO GRANDE BASIN

STATUS OF RESERVOIR STORAGE, MARCH 1, 1947

STREAM	RESERVOIR	USABLE CAPACITY	THOUSANDS OF ACRE FEET IN STORAGE				
			About March 1				10-year Ave.
		1000 A.F	1947	1946	1945	1944	1936-45
RIO GRANDE							
	Rio Grande	45.8	4.8	7.5	20.2	7.8	17.2
	Santa Maria	45.0	4.4	6.7	11.3	4.9	9.4
	Sanchez	103.2	6.1	13.1	10.2	14.9	16.5
	Terrace	17.7	3.2	1.6	3.4	2.8	3.9
	Continental	26.7	1.2	13.1	17.7	7.8	6.3
	Elephant Butte	2273.7	543.7	1070.7	1257.4	1198.7	1135.4
	Caballo	365.0	288.9	266.3	297.8	282.0	194.2
CHAMA RIVER							
	El Vado	226.0	30.6	90.4	91.3	37.0	61.4
CANADIAN RIVER							
	Conchas	600.0	366.8	341.5	346.9	393.3	247.6
PECOS RIVER							
	Alamogordo	148.0	49.4	29.6	44.4	55.8	79.1
	McMillan-Avalon	45.1	7.2	4.2	6.6	8.9	20.7

SNOW SURVEYS AND IRRIGATION WATER FORECASTS
for
RIO GRANDE BASIN
March 1, 1947

SUMMARY OF MARCH 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY WATERSHEDS

WATERSHEDS	Snow Depth			Water Content			Number Courses in Average	Snow Density			1947 Water Content in percent of	
	Eleven Year Avg.*	1946	1947	Eleven Year Avg.*	1946	1947		Eleven Year Avg.*	1946	1947	Eleven Year Avg.*	1946
	In.	In.	In.	In.	In.	In.		Percent	Percent	Percent		
Rio Grande	28.4	15.2	30.3	8.4	4.0	7.5	21	30	26	25	89	187
South Fork	71.7	43.2	70.6	21.6	10.0	20.0	1	30	24	28	93	200
Upper Rio Grande	20.0	3.5	21.0	4.3	0.5	4.0	2	22	14	19	93	800
Alamosa River	39.8	23.8	44.2	10.0	5.2	10.7	2	25	22	24	107	206
Conejos River	45.0	21.6	43.1	13.0	5.7	11.2	2	29	26	26	86	197
Culebra River	34.2	16.1	40.2	8.8	4.3	9.7	1	26	27	24	110	225
Chama River	48.3	26.6	45.7	14.8	8.7	13.3	3	31	33	29	90	153
Rio Taos	22.1	8.4	24.5	6.1	2.4	6.0	1	28	29	24	99	250
Pueblo Creek	31.4	16.5	34.0	7.8	4.2	6.8	2	25	25	20	87	162
Pecos River	17.6	8.0	11.0	4.6	2.2	2.2	3	26	27	20	48	100
Canadian River	24.0	11.3	26.4	6.2	2.7	5.6	4	26	24	21	90	207

*Some for shorter periods

PRECIPITATION DATA

WATERSHED	STATE	Precipitation October 1 to February 28	Departure from Normal	Precipitation* February	Departure from Normal
		Inches	Inches	Inches	Inches
Canadian	New Mexico	3.96	+0.70	0.28	-0.20
Rio Grande	Colorado	2.51	-0.29	0.12	-0.32
Rio Grande (N)	New Mexico	5.07	-0.17	0.72	-0.37
Rio Grande (S)	New Mexico	2.47	-0.69	0.09	-0.43
Pecos	New Mexico	4.10	+0.43	0.12	-0.46

Precipitation during February was below normal throughout the area. The accumulated precipitation since October 1 was above normal for all watersheds except the Pecos and Canadian.

*February precipitation tentative

RIO GRANDE IRAINAGE SNOW SURVEYS
March 1, 1947

DRAINAGE BASIN and SNOW COURSE	LOCATION No. and State	Sec.	Twp. or Lat.	Range or Long.	Elev.	SNOW COVER MEASUREMENTS Date of Survey	Snow Depth (Inches)	Water Content (Inches) 1947	1946	1945	Past Record Years of Record	Av.Water Content (Inches)
						RIO GRANDE						
Wolf Creek Pass	26 Colo.	4	37N	2E	10000	2/28	70.6	20.0	10.0	20.9	11	21.6
Upper Rio Grande	27 "	13	40N	4W	9350	3/2	24.4	5.0	1.0	4.2	10	5.0
Silver Lakes	47 "	15	36N	5E	9600	2/28	28.3	5.3	2.9	5.0	11	4.6
River Springs	49 "	25	33N	6E	9300	3/1	29.3	6.7	3.4	6.1	11	6.3
LaVeta Pass #2	74 "	22	28S	70W	9300	2/28	30.9	8.0	4.6	9.0	10	6.9
Summitville	76 "	30	37N	4E	11500	3/1	60.2	16.1	7.6	13.5	9	15.3
Cumbres Pass #2	77 "	17	32N	5E	10000	3/3	56.9	15.8	7.9	19.8	11	19.8
Santa Maria	80 "	8	41N	2W	9700	3/2	17.7	3.1	T	3.1	9	3.6
Culebra	82 "		37.2N	105.2W	10000	3/1	40.2	9.7	4.3	11.2	8	8.8
Fort Garland	84 "	13	29N	72W	8200	3/2	6.8	1.3	0	5.3	7	3.1
Red River	1 N.Mex.	29	28N	15E	9500	2/27	23.9	6.0	2.9	13.1	11	8.1
Taos Canyon	2 "	10	25N	15E	9000	3/1	24.5	6.0	2.4	8.8	11	6.1
Aspen Grove	4 "	12	18N	10E	9100	2/28	11.2	2.1	2.7	5.2	11	4.8
Lee Ranch	5 "	3	18N	4E	9050	2/27	24.1	4.8	2.8	7.0	11	6.8
Canjilon	6 "	4	26N	5E	9500	3/1	44.3	15.2	13.8	--	10	16.5
Hematite Park*	9 "	8	28N	15E	9500	3/1	17.8	4.1	1.5	7.4	11	5.3
Tres Ritos	12 "	23	22N	13E	9000	3/1	25.2	5.7	3.1	6.7	10	6.0
Pay Role	15 "	16	28N	7E	9700	3/1	36.1	8.8	4.3	9.5	7	8.1
Jicarilla	16 "	9	29N	1W	8500	3/6	7.7	1.6	0.7	3.7		
Chama Divide	17 "		36.9N	106.7W	7750				0.9	6.3		
Chamita	18 "		36.9N	106.7W	8500				2.7	11.1		
Cordova	19 "	22	22N	13E	10100	3/1	42.9	8.0	5.3	13.1	6	9.6
Panchuela #2	20 "	27	19N	12E	8300	2/28	10.1	1.6	0.9	4.2	11	3.6
Big Tesuque	21 "	17	18N	11E	10000	2/28	11.8	2.8	3.1	8.1	6	5.5
				Average for drainage			30.3	7.5	4.0	9.1		8.4

*On adjacent drainage

RIO GRANDE DRAINAGE SNOW SURVEYS
March 1, 1947

DRAINAGE BASIN and SNOW COURSE	LOCATION No. and State	Sec.	Twp. or Lat.	Range or Long.	Elev.	SNOW COVER MEASUREMENTS Date of Survey	Snow Depth (Inches)	Water Content (Inches) 1947	1946	1945	Past Record Years of Record	Av. Water Content (Inches)
RIO GRANDE TRIBUTARIES IN SAN LUIS VALLEY												
UPPER RIO GRANDE												
Upper Rio Grande	27 Colo.	13	40N	4W	9350	3/2	24.4	5.0	1.0	4.2	10	5.0
Santa Maria	80 "	8	41N	2W	9700	3/2	17.7	3.1	T	3.1	9	3.6
		Average for drainage					21.0	4.0	0.5	3.7		4.3
SOUTH FORK RIO GRANDE												
Wolf Creek Pass	26 Colo.	4	37N	2E	10000	2/28	70.6	20.0	10.0	20.9	11	21.6
ALAMOSA RIVER												
Silver Lakes	47 Colo.	15	36N	5E	9600	2/28	28.3	5.3	2.9	5.0	11	4.6
Summitville	76 "	30	37N	4E	11500	3/1	60.2	16.1	7.6	13.5	9	15.3
		Average for drainage					44.2	10.7	5.2	9.2		10.0
CONEJOS RIVER												
River Springs	49 Colo.	25	33N	6E	9300	3/1	29.3	6.7	3.4	6.1	11	6.3
Cumbres Pass*#2	77 "	17	32N	5E	10000	3/3	56.9	15.8	7.9	19.8	11	19.8
		Average for drainage					43.1	11.2	5.7	12.9		13.0
CULEBRA RIVER												
Culebra	82 Colo.		37.2N	105.2W	10000	3/1	40.2	9.7	4.3	11.2	8	8.8
RIO GRANDE TRIBUTARIES IN NEW MEXICO												
CHAMA RIVER												
Cumbres Pass #2	77 Colo.	17	32N	5E	10000	3/3	56.9	15.8	7.9	19.8	11	19.8
Canjilon	6 N.Mex.	4	26N	6E	9500	3/1	44.3	15.2	13.8	--	10	16.5
Pay Role	15 "	16	28N	7E	9700	3/1	36.1	8.8	4.3	9.5	10	8.1
Jicarilla	16 "	9	29N	1W	8500	3/6	7.7	1.6	0.7	3.7		
Chama Divide	17 "		36.9N	106.7W	7750				0.9	6.3		
Chamita	18 "		36.9N	106.7W	8500				2.7	11.1		
		Average for drainage					45.8	13.3	8.7	14.7		14.8

*On adjacent drainage

RIO GRANDE DRAINAGE SNOW SURVEYS
March 1, 1947

DRAINAGE BASIN and SNOW COURSE	LOCATION					Date of Survey	Snow Depth (Inches)	SNOW COVER MEASUREMENTS Water Content (Inches)			Years of Record	Past Record Av. Water Content (Inches)
	No. and State	Sec.	Twp. or Lat.	Range or Long.	Elev.			1947	1946	1945		
RIO TAOS												
Taos Canyon	2 N.Mex.	10	25N	15E	9000	3/1	24.5	6.0	2.4	8.8	11	6.1
PUEBLO CREEK												
Tres Ritos	12 N.Mex.	23	22N	13E	9000	3/1	25.2	5.7	3.1	6.7	10	6.0
Cordova	19 "	22	22N	13E	10100	3/1	42.9	8.0	5.3	13.1	6	9.6
				Average for drainage			34.0	6.8	4.2	9.9		7.8
PECOS RIVER												
Aspen Grove*	4 N.Mex.	12	18N	10E	9100	2/28	11.2	2.1	2.7	5.2	11	4.8
Panchuela #2	20 "	27	19N	12E	8300	2/28	10.1	1.6	0.9	4.2	11	3.6
Big Tesuque*	21 "	17	18N	11E	10000	2/28	11.8	2.8	3.1	8.1	6	5.5
				Average for Drainage			11.0	2.2	2.2	5.8		4.6
CANADIAN RIVER												
Hematite Park	9 N.Mex.	8	28N	15E	9500	3/1	17.8	4.1	1.5	7.4	11	5.3
Ocate Mesa	10 "	25	24N	16E	9200	3/3	19.7	4.6	1.0	3.3	10	3.7
Tres Ritos*	12 "	23	22N	13E	9000	3/1	25.2	5.7	3.1	6.7	10	6.0
Cordova*	19 "	22	22N	13E	10100	3/1	42.9	8.0	5.3	13.1	6	9.6
				Average for drainage			26.4	5.6	2.7	7.6		6.2

*On adjacent drainage

The following organizations cooperate in the snow surveys and irrigation water supply forecasts for the Colorado, Missouri-Arkansas and Rio Grande watersheds by furnishing funds or services.

STATE
- Colorado State Engineer
- Wyoming State Engineer
- Utah State Engineer
- New Mexico State Engineer
- Montana State Engineer
- Nebraska State Engineer
- Colorado Experiment Station
- Colorado Extension Service
- Montana Experiment Station
- Utah Experiment Station

FEDERAL
- Department of Agriculture
  - Forest Service
  - Soil Conservation Service
- Department of Interior
  - Bureau of Reclamation
  - Indian Service
  - Geological Survey
  - National Park Service
- Department of Commerce
  - Weather Bureau
- War Department
  - Army Engineer Corps

PUBLIC UTILITIES
- Colorado Public Service Company
- Western Colorado Power Company
- Montana Power Company
- Denver and Rio Grande Western R. R. Company

MUNICIPALITIES
- City of Bozeman
- City of Denver
- City of Boulder

WATER USERS ORGANIZATIONS
- Poudre Valley Water Users' Association
- Arkansas Valley Ditch Association
- Colorado River Water Conservation District

IRRIGATION PROJECTS
- Farmers Reservoir and Irrigation Company
- San Luis Valley Irrigation District
- Santa Maria Reservoir Company
- Costilla Land Company
- Uncompahgre Valley Water Users' Association
- Wyoming Development Company
- Goshen Irrigation District
- Kendrick Project
- Pathfinder Irrigation District
- Salt River Valley Water Users' Association
- San Carlos Irrigation and Drainage District
- Twin Lakes Reservoir and Canal Company

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